

# MEDICINE TODAY

Current comment on medical progress, discussion of selected topics from recent books or periodic literature, by contributing members. Every member of the California Medical Association is invited to submit discussion suitable for publication in this department. No discussion should be over five hundred words in length.

## Urology

**E**xperimental Perfusion of the Frog's Kidney.—In view of the very valuable and interesting studies of Richards and co-workers in this country with the frog's kidney, some recent studies by Hartwich<sup>1</sup> are of interest. When the pressure of a Ringer's solution perfused through an isolated frog's kidney is raised, there is an increase in the amount of urine secreted but this is not always proportional. When the iliac artery is ligated, the amount of urine is greater but the flow less than when open, a condition that is explained by the fall in the pressure in the aorta and not by a reabsorption in the tubular cells. The perfusion pressure by way of the portal vein must be raised to about 8 to 10 centimeters before urine is secreted, which is then due to the back-flow through the anastomotic vessels of the tubules to the glomeruli. The chlorids of the urine were found to be less than of the fluid perfused and the urine is sugar-free so long as the sugar percentage in the perfusion fluid is not above 0.05 to 0.06 per cent. And Hartwich concludes that this result is due to the low permeability of the kidney filter and not to reabsorption of sugar. Increasing the acidity promotes the rate of perfusion and secretion, whereas changing the hydrogen ion concentration towards the alkaline side diminishes both. Hypertonic perfusion fluids diminish perfusion and secretion, whereas hypotonic fluids increase both. Increase of the calcium ions increases the perfusion rate and amount of urine but, if the increase is great, then urine secretion stops altogether. Grape sugar in different concentrations, as well as other kinds, has no action upon the perfusion rate or diuresis of the isolated frog's kidney. Magnesium and sodium sulphate in certain concentrations slow the perfusion rate and increase the amount of urine. It was found that a low concentration with sodium sulphate diminished the rate of flow and secretion, and magnesium sulphate was active only when the iliac artery was tied. The action failed with an open artery because of the antagonistic calcium salts transported in the kidney. In no experiment was a diuretic action noted except when there was a corresponding change of the rate of flow, so that it is concluded that secretion of the urine is dependent to a high degree upon the rate of blood flow through the kidney.

Perfusion with a caffeine solution of about 1:250,000 with the iliac artery tied off increased the rate of flow and secretion. With open vessels the amount of urine was proportional to the increased flow. With high caffeine concentrations,

the diuresis lasted longer than the increase of perfusion rate. The effect of caffeine did not wear off with repeated use, and its different effects were more or less proportional to the size of the dose used. Theophyllin gave results similar to caffeine. Urea solutions of 1:100 to 1:500 increased the rate of flow and the amount of urine and the increased secretion never outlasted the increased perfusion rate. Urea diuresis, therefore, seemed wholly due to the result of effect on the blood vessels. Perfusion with sublimate and novasurol solutions increased urinary flow, which to some extent was independent of the rate of perfusion. Cadmiumchlorid, closely allied in its action to quicksilver, usually produced an increase which, in contrast to quicksilver diuresis, was usually parallel to the rate of perfusion. Strophanthin solutions increased the rate of flow and produced diuresis, whereas perfusion with atropin and pilocarpin had no effect. Phloridzin in concentrations of 1:50,000 to 1:5000 produced diffusion and in still higher amounts increased secretion. In concentrations of 1:3000 there was a diminished secretion and, under certain conditions, complete cessation of the formation of urine. Glycosuria appeared even in concentrations of 1:10 million up to 1:1 million. Glycosuria of phloridzin and diuresis have no interrelation as the glycosuria seems undoubtedly due to an increased permeability of the glomerulus. Chlorid secretion seemed in no way affected by phloridzin.

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## REFERENCE

1. Hartwich: Einfluss pharmakologisch wirksamer Substanzen auf die isolierte Froschniere. I. Mitteilung: Methodik, Einfluss des mechanischen und osmotischen Druckes, der Wasserstoffionenkonzentration, des Zuckers and des Magnesium und Natriumsulfats, Arch. f. exper. Path. u. Pharm., 111, 81-98, 1926. II. Mitteilung: Diuretika und andere Substanzen, Ibid., 206-217. III. Mitteilung: Die Wirkung des Phlorrhizins, Ibid., 115, 328-333, 1926.

## Medicine

**P**ituitary Tumors and Diabetes Insipidus.—While diabetes insipidus is not a common condition, it is occasionally met with in general practice and in some of the early or less marked cases it may be easily overlooked. The condition is characterized by the excretion of large amounts of watery but otherwise normal urine associated with excessive thirst. The patient may present no other symptoms and be apparently in excellent general health.

All the etiological factors in the production of diabetes insipidus are not clear, particularly in